Solvent Update, Labs-01

Solvent Loss Break-Up (Apr'25 till Feb'26)

	Existing	Proposed	
Labs-I in	**31,399**		**KL**
Fresh solvent	**20,700**	**17,583**	
RFS From In-House SRS & Vendors (Job work)	**9,525**	**12,406**	
In-process distilled re-use	**1,179**	**1,410**	
Labs-I out	**19,833**	**22,391**	**KL**
Spent sent to Job work	5,881	7,500	
Spent sales	5,028	4,000	
Sent to SRS for RFS (Inc. Other Units.., Zen & LS3)	8,891	10,891	
Plant in - Plant out(Gap in KL)	**11,566**	**9,008**	
% of gap	**36%**	**29%**	
Spent sent to SRS (In-house..., Labs-01)		6,889	
RFS From SRS (Labs-01)		4,651	
SRS In - SRS out(Gap in tons)		2,238	
% of gap		**32%**	

Note: Out of 11,566 KL ~75% is process loss & 25 % is SRS loss

Process loss:--- Major is Methanol & Acetone which is going along with Aq. streams (into ETP)

Top Solvent Consumptions data

Total Solvent Used (KL): -- 31,399

Note: Below 06 Solvents contribute about 93% by volume

Solvent	Total Qty (KL)	Existing				Proposed			
		Fresh (KL)	Recovery (KL)	Fresh%	Recovery %	Fresh (KL)	Recovery (KL)	Fresh%	Recovery %
Ethyl Acetate	10,037	4,447	5,590	44.30%	55.70%	4,447	5,590	44.3%	55.7%
Methanol	5,469	5,148	321	94.12%	5.88%	3,469	2,000	63.4%	36.6%
Acetone	5,393	3,746	1,647	69.46%	30.54%	3,446	2,200	59.2%	40.8%
DCM	3,904	2,898	1,006	74.23%	25.77%	1,904	2,000	48.8%	52.2%
Toluene	2,822	1,193	1,629	42.28%	57.72%	1,193	1,629	42.3%	57.8%
IPA	1,607	1,413	194	87.92%	12.08%	957	650	59.6%	40.4%
Total	**29,232**	**18,845**	**10,387**	**64.45%**	**35.55%**	**15,416**	**13,816**	**52.74%**	**47.26%**

PHASE-02 CAPEX 23.0 Cr. (Permenent Set-up for Aq streams)

- 05 Reactor --- 20 KL SSR (02 No’s), 15 KL SSR (01 No’s) & 15 KL MSGL (02 No’s)

Note: 02 No’s with Thermosyphone re-boiler along with packed column (in vapour line with 10 M packing height)

- PSA (pressure swing adsorption), Column packing & accessories
- Civil & Structure for 04 Recator slot
- Pipes & fitting, service equipments(Electrical, Utility & process lines, Cooling tower, Vacuum systems...,)
- Spent segeration Methanol & Acetone (cleaning solvents).
- Modifications related to -50°C brine system usage (inplace of dry ice), Vent condenser.
- Implementation of CIP system for 02 blocks as PoC to reduce the cleaning solvent consumption.
- Vacuum controllers, utility flow measuring instruments, vent condenser for catch pot..., to avoid vapour loss.

Note:

- **Permenent set-up (with Pre & post treatment, PSA & 10 Mts. column packing’s) ---- 12.5 Cr.**
- **Solvent loss minimization ---- 7.5 Cr**
- **Utility automation for methanol loss reduction (avoid mix-up) ---3.0 Cr (Only CHB with ON/OFF& flow switch).**

ROI on CAPEX of 20 Cr. below 1.5 Years

- Current fresh consumption @ Labs-01 ---- 1885 KL/month (Total); **1710 KL form top 06 solvents**
- Avg. fresh solvent cost --- 11.o Cr/month
- Cost per KL:--- 0.0058 Cr/KL

- **Improvement**
- **Reduction in fresh consumption: ~310 KL/month**
- **Reduction in cost:--- ~1.6 Cr/month**
- **Considering OPEX @20% of improvement :-- 0.35 Cr.**
- **Net saving will be ~ 1.2 Cr.**

✓ **RoI:**

✓ **Capex: 20 Cr.**

✓ **Saving: 1.2 Cr./month**

✓ **RoI will be ~16 months (Below 1.5 Years)**

Methanol Consumption & Action plan with Capex:

Total Input:--- ~500 KL/Month

- Process:--- 250 to 280 KL
- Cleaning:--- 100 to 120 KL
- Chilling plant:--- 50 to 70 KL
- Dry Ice:--- 20 KL

Note:

- ~50 KL will be process loss as missiability along with water.
- ~80 KL loss from chilling plant.
- ~60 KL as spent mixed.

- Considering all the above net recovered solvent will be ~270 to 300 KL.
- Considering 60% as reusable quantity.
- Net Methanol re-used:--- 160 to 170 KL/Month
- ~1900 to 2000 KL/Year as re-usable solvent

- Major Product's: Rosuva, Dapa & Ezeta..,

Costing: Total of 3.65 Cr

Sageration of Cleaning MeoH from Spent: 2.15 Cr. (@15 blocks)

- **Facility creation @ blocks: 0.95 Cr**.
  - SS-304 Receiver: 0.5 KL/Block (@ 1.5 L each inc. fittings)
  - Pump: 10 m3/hr @ 40 M Head @ 3.0 L each
  - Electrical @ 0.5 L each
  - Mobile receiver 50 Lts @ 1.0 L/block
- **Pumping lines: 1.2 Cr.** (Inc., piping, fittings & fabrication)

Note: RoI will be 2.0 Years (~50% re-usable aganist input-- 100 KL).

Using -50 Utility: 0.7 Cr. Modif. cost (inc. piping, fitting & insulation)

- OPEX of -50°C chiller:-- Rs: 32.6/TR.
- Considering 08 hrs run time OPEX : 1.0 L/Month.
- Cost of Methanol: 1.0 L/Month (@ 10 Rs/L as we are using distilled).
- Dry ice cost: 3.6 L/Month

Note: ~ 2.5 L will be a direct saving (after consuming ~10 KL methanol).

Acetone Consumption & Action plan with Capex:

Total Input:--- ~500 KL/Month

- Process:--- 400 to 440 KL
- Cleaning:--- 60 to 90 KL

Note:

- ~35 to 45 KL/Month will be directly re-used as in-process distillate.
- ~200 KL will be sent to job work (purity 85 to 90%) with remaning of DCM.
- ~200 KL will be sent to job work with 35% EA.
- ~200 KL will be sell as spent mixed (~50% water).
- Spent sale (cleaning solvent ~60 KL)

Issues:

Majorly Acetone goes as mixture of DCM & EA which is impaciting on the % recovery.

- Major Product's: Panto, Dabi, & Olme..,

Costing: Total of 2.15 Cr

Sageration of Cleaning Acetone from Spent: 2.15 Cr. (@15 blocks)

- **Facility creation @ blocks: 0.95 Cr**.
  - SS-304 Receiver: 0.5 KL/Block (@ 1.8L each inc. fittings)
  - Pump: 10 m3/hr @ 40 M Head @ 3.0 L each
  - Electrical @ 0.5 L each
  - SS Mobile receiver @ 1.0 L each.
- **Pumping lines: 1.2 Cr.** (Inc., piping, fittings & fabrication)

Note: RoI will be 1.0 Years (~50% re-usable aganist input-- 60 KL).

- **CIP Nozzle:**
  - Based on the CIP nozzle efficiency for methanol further working's will be done for Acetone & other block's

IPA Consumption:

Total Input:--- ~145 KL/Month

- Almost full quantity used for process

Note:

- ~90 to 100 KL is recovered from the input (65%).
  - ~95 KL/Month is going for Job work **(~20% M.C & 95% purity)**.
  - ~10 KL is going as IPA spent.
  - ~15 - 20 KL is further going with Aq. stream after IPA distillation.
- ~10 - 15 KL is goining as mixed spent (IPA+THF+EtoH & E>A).
- ~5.0 to 10.0 KL is going as along with Aq. streams (Un-able to flash due to colour issues).

Action plan:

A) De-hydration of IPA before sending to job work.
B) Flashing of coloured Aq.IPA streams.

MDC Consumption:

Total Input:--- ~350 KL/Month

- Almost full quantity used for process

Note:

- ~170 to 180 KL is recovered from the input (50%).
  - ~155 KL/Month is going for Job work **(85% purity)**.
  - ~20 KL is going along with Acetone.
- ~50% is process loss

Action plan: Capex @ 1.5 Cr.

A) Vacuum controller---- 2.0 L X 10 No's = 20 L.
B) Vent condenser for CF catch pot's --- 6.0 L X 10 No's = 60 L.
C) Extractions or back wash using pump's 50 L (02 No's/ block)
D) Stream line of vacuum balance lines.
E) Usage of pumps for catch pots rather using vacuum.

Toluene Consumption:

Total Input:--- ~250 KL/Month

- Almost full quantity used for process

Note:

- ~85 to 90% (~225 KL) is recovered from the input.
- ~15 to 20 KL/Month will be directly re-used as in-process distillate.
- ~200 KL will be sent to SRS for recovery.
- ~80% will be recovered (inclu. fractions ~6 to 10%).
- ~120 KL will be used at unit-01.
- ~ 60 KL will be sent to other unite (which is not covered in above table).

Net 80% is recovered as re-usable solvent.

April'25 to Feb'26 SOLVENT CONSUMPTION & PROCESS OUTPUT DETAILS(KL)

		Process Input				Process Output						
Description	Density	Fresh solvent Consumption	RFS Consumption	Reactor distilled Solvent Consumption (Direct Reuse)	Total Process IN	Direct reusable recovery distilled Solvent (Direct Reuse)	ML's/Organic layers/ Mixed solvents/To be distilled	Spent solvent for disposal	Total process Output	Percentage of recovery	Inside SRS (MSN) in KL	Outside SRS(Vendor) in KL
Methanol	0.792	5,148	129	193	5,469	193	858	-	1,051	19%	328	-
Toluene	0.862	1,193	1,476	153	2,822	153	1,535	-	1,688	60%	2,185	230
Acetone	0.785	3,746	1,285	362	5,393	362	888	-	1,251	23%	336	829
ISOPROPYL ALCOHOL (IPA)	0.786	1,413	194	-	1,607	-	680	-	680	42%	26	946
Methylene Chloride	1.326	2,898	888	119	3,904	119	1,217	-	1,335	34%	539	917
Ethyl Acetate	0.902	4,447	5,252	339	10,037	339	4,505	-	4,844	48%	4,580	2,666
Di Methyl Formamide	0.948	144	11	-	154	-	-	-	-	0%	-	-
Tetra Hydro Furan	0.888	466	152	-	618	-	139	-	139	22%	21	124
N-Heptane	0.680	139	-	-	139	-	56	77	133	95%	-	-
Methyl Tertiary Butyl Ether	0.740	310	12	-	323	-	167	166	333	103%	-	-
Cyclo Hexane	0.774	290	96	14	400	14	225	24	263	66%	308	-
Iso Propyl Acetate	0.870	107	-	-	107	-	-	117	117	109%	-	-
Distilled Mixed Solvent	0.870				0	-	-	2,911	2,911		-	-
Mixed CFML's Solvents	0.800				0	-	3,343	700	4,043			-
Acetone+EA	0.840				0	-	-	-	-		502	-
Acetone+Water	0.800				0	-	-	849	849			
Total		20,700	9,521	1,179	31,399	1,179	13,626	5,028	19,833		8,826	5,713

Total Solvent Used (KL): -- 31,399

Solvent	Total Qty (KL)	Fresh (KL)	Recovery (KL)	Fresh%	Recovery %
Ethyl Acetate	10,037	4,447	5,590	44.30%	55.70%
Methanol	5,469	5,148	321	94.12%	5.88%
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Toluene	2,822	1,193	1,629	42.28%	57.72%
IPA	1,607	1,413	194	87.92%	12.08%
Contribution	**29,231**			**93.1%**	

Major Increase in Output's

- **Methanol**:-- 53 Kl to 125 KL
- **IPA**:-- 53 KL to 93 KL
- **DCM:**-- 124 KL to 151 KL

Labs-1 Process Output - FY 2025-26(Apr'25-Feb'26)

Description	Density	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total in MT
Methanol	0.792	26	32	55	64	56	43	75	72	98	157	121	632
Ethylene Dichloride	1.253												-
Toluene	0.862	110	53	61	96	139	207	229	93	139	246	162	1,324
Acetone	0.785	50	36	82	212	30	82	73	67	86	86	85	697
ISOPROPYL ALCOHOL (IPA)	0.786	85	11		45	60	69	40	93	69	94	114	534
Methylene Chloride	1.326	91	1		113	113	147	160	98	151	197	147	1,613
Ethyl Acetate	0.902	285	209	261	479	311	484	440	308	455	778	494	4,064
Tetra Hydro Furan	0.888	9		3	15	18	14	9	6	17	16	7	101
N-Heptane	0.680	3	2	2	4	3	4	6	8	14	14	12	49
Methyl Tertiary Butyl Ether	0.740	7	7	9	12	9	16	25	35	47	41	40	184
Cyclo Hexane	0.774	4	4	9	24	17	11	27	23	24	45	37	174
Iso Propyl Acetate	0.870	2	5	5	13		11	13	11	13	18	13	90
Distilled Mixed Solvent	0.870	89	8	64	99	214	218	206	231	302	292	294	1,754
Mixed CFML's Solvents		705	668	734	451	459	574	350	311	489	177	45	-
Total		1469	1038	1288	1632	1433	1890	1660	1365	1911	2170	1576	11,272